

SUMMARY AND SIGNIFICANCE OF OVERLOOKED JAPANESE LITERATURE ON MYZOSTOMIDA

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Abstract.—The content of hitherto uncited or unreviewed Japanese scientific literature on Myzostomida is summarized with comments. The range of *Myzostoma willemoesii* von Graff has been extended to Japan, with an additional host record (a recent unpublished record from the Ogasawara Islands is also given). An associated myzostome has been reported from the hexactinellid sponge *Farrea*. *Myzostoma crassum* Okada, 1922 is an overlooked but available nomen dubium. Cleavage has been studied in *M. deani* McClendon. *Myzostoma echinus* von Graff has been misidentified consistently as *M. costatum* Leuckart in Japanese literature, and another species whose true identity is unclear has often been misidentified as *M. ambiguum* von Graff. Other possible recent misidentifications are pointed out herein. *Notopharyngoides* Fishelson, nomen nudum, has inadvertently been made available as *Notopharyngoides* Uchida, 1992, with the type species *Myzostoma ijimai* Hara & Okada, 1921.

Most of the original descriptions of Japanese species of myzostomidan worms (Japanese name: kyūkōchū or suikuchimushi), found as quasi-parasitic commensals or as endoparasites of crinoids and ophiuroids, were published by European or American zoologists (e.g., von Graff 1884, McClendon 1906, Jägersten 1937, Fedotov 1938). While several taxonomic and developmental papers written in English by Japanese scientists are well known (Hara & Okada 1921; Okada 1922b, 1933; Kato 1952), a considerable amount of related literature, mostly written in Japanese, seems not to have come to the attention of Western zoologists. A few such papers have been cited in bibliographies by Hartman (1951), Kato (1952), and Prenant (1959), but the findings were either not reviewed or misquoted. The contents of these largely ignored works are summarized here, with remarks on their significance. It should be noted in advance that the cited faunal encyclopedias and field guides were written and edited by eminent zoologists and are or once were in day-to-day use as reference books in Japanese laboratories;

thus they are regarded here as an intrinsic part of the zoological literature. Although *Myzostoma*, not *Myzostomum*, is the correct original spelling of the main genus in question (Grygier 1992), names are spelled here following the cited Japanese authors.

Historical Review and Comments

Hara (1895) reviewed a controversy surrounding the supposed excretory organs (i.e., metanephridia) of *Myzostoma*. On p. 247 the nomen nudum *M. Ijimeii* appeared in the context of histological information about an undescribed species. This was evidently a reference to the species later published as *M. ijimai* Hara & Okada, 1921.

Hara (1896) reported that 20 specimens of *Antedon inaequalis* Carpenter collected at Misaki bore galls caused by *Myzostomum willemoesii* von Graff. The supposed host now belongs to the genus *Glyptometra*, but the range of *G. inaequalis* does not extend to Japan (Clark 1950); two other nominal species of *Glyptometra* have been recorded from Misaki, *Glyptometra lata* (A. H. Clark)

and *G. septentrionalis* (A. H. Clark), and presumably one of these was the host. Grygier (1990) was unaware of Hara's (1896) record and neither included *M. willemoesii* in a count of Japanese myzostome species nor took the otherwise unrecorded host into account in a discussion of host specificity. This myzostome has been known to infest eight other hosts, including four species of *Glyptometra*, and Hara's report extends its range northward from the nearest record in the central Philippines (Grygier 1990).

The Philippine record, based on specimens in the National Museum of Natural History, Smithsonian Institution (USNM 167184), is fully documented here: two galls on an arm of one *Glyptometra tuberosa* (Carpenter) (USNM 35664), "Albatross" sta. 5537, 19 August 1909, between Negros and Siquijor, 9°11'00"N, 123°23'00"E, 465 m. There is another lot of *M. willemoesii* in the Osaka Museum of Natural History (Catalogue no. Iv 1293) from an intermediate locality near the Japanese Ogasawara (Bonin) Islands: four galls formed from enlarged, twisted pinnules on one *G. tuberosa* (no. 700(2)), "Sôyô-Maru" Cruise 5 (d1-d10), 4 August 1976, 27°05.9–23.0'N, 142°03.8–05.8'E, 165–345 m.

Komai (1919) briefly introduced the Myzostomida as a whole, summarized McClendon's (1906) taxonomic paper, and reproduced figures from it.

Okada (1920) reported four specimens of *Myzostoma* collected from the hexactinellid sponge *Farrea* sp. He assigned the specimens to *Myzostoma antennatum* von Graff based on morphological resemblance, although they were of a different color. This is the only report of myzostomes collected from a sponge, although it might be suspected that the worms had been lost accidentally from a crinoid or ophiuroid during collection.

Okada (1922a) published a key to the Myzostomida of Japan preceded by a long, literature-based, general introduction of the group. The key included 13 nominal species

of *Myzostoma*, one of which, *My.* (sic) *crassum* seems never to have been fully described. In the accompanying table, this species was referred to as *M. crassum* H. (for Hara), but I have been unable to locate any published description by Hara. Inasmuch as this name appeared in a key, it was accompanied by a diagnosis and is available with Okada as its author; however, it is an unrecognizable nomen dubium. According to the relevant couplet, in *Mg.* (sic) *antennatum* the position of the female (i.e., male; lapsus or misprint of a Japanese kanji character) genital opening is directly outside the third parapodium while in *M. crassum* the male opening lies between the third parapodium and (which?) sucker (i.e., lateral organ). This is a very subtle distinction. The host of *M. crassum* is *Antedon macrodiscus* Hara (i.e., *Tropiometra afra macrodiscus*) from near-coastal waters off Misaki, Kanagawa Prefecture. My own extensive survey (Grygier 1990) turned up only three species of myzostomes on this host, *M. bocki* (Jägersten), *M. nasonovi* Fedotov, and *M. ijimai*, all of which can be distinguished from *M. antennatum* by gross morphology and are thus unlikely to be synonymous with *M. crassum*.

Okada (1930) briefly described the early cleavage of embryos of *Myzostoma deani* McClendon, misspelled as *M. cleani* when reviewed by Kato (1952), from Enoshima, Tateyama Bay, Chiba Prefecture. This is the only report about developmental biology in this species.

Much more recently, Utinomi & Kogo (1965) recorded: 1) *Myzostomum* sp. from *Comanthus (Cenolia) japonica* (Müller) (i.e., *Oxycomanthus japonicus*), 2) *Myzostomum* sp. and *M. costatum* Leuckart from *Comanthus (Comanthus) parvicirra* (Müller), and 3) *Myzostomum* sp. from *Comanthina schlegeli* (Carpenter). All were from the southwestern part of the Kii Peninsula (especially Tanabe Bay), Wakayama Prefecture. The worms from *C. schlegeli* were found in sub-epidermal cysts on the arms

or discs, with openings to the ambulacral grooves.

The collections of the Seto Marine Biological Laboratory, where Kogo did this work, include four catalogued vials labelled *Myzostomum costatum*, but all are misidentified. Poly 138 was isolated from *Comanthus parvicirra* but now the vial contains only a dry crinoid arm fragment. Poly 139, host unstated, contains four *M. fissum* von Graff and seven small specimens that may also belong to that species or to an undescribed, closely related species. Poly 140, host unstated, contains two individuals of a probably undescribed species in the *M. crosslandi* species-group sensu Grygier (1990). Poly 137, host unstated, contains one specimen which is similar to the Japanese myzostome, host unknown, which Jägersten (1940) identified as *M. cf. insigne* Atkins and which was reexamined by the author in the Zoological Museum in Copenhagen in 1986. Being unpigmented, both specimens more closely match Atkins's (1927) original description of *M. pottsi*. Grygier (1990) considered *M. insigne* and *M. pottsi* to be junior synonyms of *M. echinus* von Graff. Photographs of so-called *M. costatum* in some handbooks (Utinomi 1964; Imajima 1975a, 1983a) actually show *M. echinus* with the color pattern described by Atkins (1927) for *M. insigne*. Uchida (1992) mentioned that *M. costatum* was found on *Lamprometra palmata* (Müller) and *Comanthina schlegeli* in Japan, but did not include an illustration by which to judge his identification.

The species referred to as *M. ambiguum* in all Japanese primary and secondary literature is also misidentified. Treatment of it as *M. ambiguum* dates to Jägersten (1937), who showed that it was distinct from *M. antennatum*, and whose opinion was followed by Fedotov (1938), Kato (1952), and the compilers of several field guides and faunal encyclopedias (Kato 1960; Okada & Kato 1965, 1979; Nishimura & Suzuki 1971; Imajima 1975b, 1983b). Grygier (1990)

considered the Japanese "*M. ambiguum*" to be a different species, but whether some of the earlier records actually correspond to *M. longimanum* (Jägersten), *M. vastum* von Graff (sensu von Graff 1884), or an undescribed species is still uncertain. True *M. ambiguum* has a wide tropical distribution and can easily be recognized on the basis of von Graff's (1887) illustration, particularly with regard to the rather narrow and truncated rear end of the body and the barely submarginal location of the proboscis pocket opening. In Japan, true *M. ambiguum* does occur in Okinawa, based on specimens identified by the author in the Department of Marine Sciences, University of the Ryukyus.

A recent guide to marine invertebrates of Okinawa Prefecture, southern Ryukyus Islands (Iwase et al. 1990:91) included photographs of living *Myzostomum elegans* von Graff (sic) and *Myzostomum ijimai* Hare et Okada (sic), the former on an arm of *Comanthus parvicirra*, the latter removed from the mouth of *Tropiometra afra macrodiscus*. The bull's-eye color pattern of the former corresponds to that of *Myzostoma polycyclus* Atkins (cf. Atkins 1927), which was (implicitly) treated as separate from *M. elegans* by Grygier (1990). Uchida (1992) labelled other photographs of perhaps the same individuals as *Myzostomum polycyclus*. The supposed *M. ijimai*, the same individual of which appears in a photograph in Uchida (1992), has a series of discrete submarginal lappets like those of *M. platypus* von Graff and *M. aruense* Remscheid, unlike the continuous, wavy-edged, submarginal brim of *M. ijimai* (cf. Hara & Okada 1921, Jägersten 1937, Kato 1960, Okada & Kato 1965; the species is called *Myzostomum ijimae* in the last two references). The specific identification of the Ryukyuan specimen is thus questionable despite its occurrence on the proper host.

Noting that the proboscis protrudes from the dorsal surface in *M. ijimai*, Uchida (1992) remarked that the genus *Notophar-*

ngoides had been proposed for that reason. For lack of a diagnosis, *Notopharyngoides* was a nomen nudum when introduced by Fishelson (1974, 1976), but Uchida's (1992) remarks constituted a diagnosis for it, and its use in connection with a single species name constituted a type species designation. Therefore, Uchida (1992) inadvertently validated this former nomen nudum and must be recognized as the author of *Notopharyngoides*, with the type species *Myzostoma ijimai*. *Notopharyngoides* may be considered equivalent to the *M. platypus* species-group sensu Grygier (1990).

Uchida (1992) presented a photograph of *Myzostomum bocki* on its host, *Tropiometra afra macrodiscus*, but the banded color pattern of the worm strongly suggests that it is really *Myzostoma nasonovi*. Grygier (1990) considered these two species to be synonymous, but after examining specimens of both found that they can be distinguished unambiguously by the banding and the parapodial hook apparatus (Grygier 1992).

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